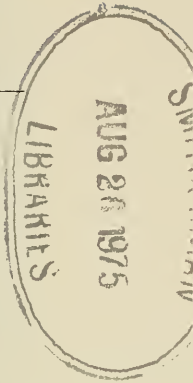


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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONTWO NEW SPECIES OF *BATHYCONCHOECIA*
(MYODOCOPA HALOCYPRIDIDAE) FROM THE
CARIBBEAN SEA

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The genus *Bathyconchoecia* Deevey 1968 was established to include 6 new species of epibenthic pelagic ostracods from the Gulf of Mexico and 2 species previously assigned to the genus *Euconchoecia*. Since then 7 more species have been described (Poulsen, 1969a, 1969b, 1972; Kornicker, 1969; Angel, 1970). Members of this genus apparently live just over the bottom, in regions difficult to sample with plankton nets, and have been caught over a known depth range of 130 to 3165 m. As noted by Angel (1973), some of the species seem to be more bathypelagic than epibenthic. Poulsen (1972) has divided the known species into four more or less natural groups. *B. deeveyae* Kornicker and *B. septemspinosa* Angel differ from all other species in having long dorsal, lateral, and rostral spines, as well as a long spine at the postero-dorsal corner of the right shell. *B. sagittarius* Deevey and *B. latirostris* Poulsen are distinguished by the high numbers of setae on the maxilla and the fifth and sixth limbs. A third group includes the small species less than 2 mm long, *B. paulula* Deevey, *B. laqueata* Deevey, *B. kornickeri* Deevey, *B. lacunosa* (Müller), *B. galerita* Deevey, and *B. nodosa* Poulsen, in which the shell is usually strikingly sculptured and the height of the shell is 60-70% of the length. Included in the fourth group are larger species 3.5-7 mm long: *B. baskiae* Poulsen, *B. foveolata* Deevey, *B. darcythompsoni* (Scott), *B. crosnieri* Poulsen, and *B. subrufa* Angel; in these species the height of the shell is 40-60% of the length and the

sculpturing on the shell is not as striking as in most of the smaller species.

Three specimens of *Bathyconchoecia* were found in samples collected by Dr. Harding B. Owre Michel on PILLSBURY Cruises in the Caribbean Sea. Two of these, a mature male 4 mm long and a juvenile specimen 1.25 mm long, are new species; the third specimen is considered the immature male of a species described from the Gulf of Mexico. All three specimens belong in the fourth group of larger species. The station locations in the Caribbean Sea and Gulf of Mexico where 8 species of *Bathyconchoecia* have now been found are shown in Fig. 1. I am deeply indebted to Dr. Michel for permission to examine the Caribbean samples. This work was partially supported by grant GA-36512 from the National Science Foundation.

Poulsen's (1972) key to 15 species has been changed to include the two new species. As Poulsen noted, the key is provisional since most of the species are known from only one or a few specimens, or from only one sex or a juvenile specimen. Sexual dimorphism is not marked in this genus. Aside from the male claspers on the endopodite of the second antenna and the male copulatory organ, the other differences noted may be in the relative height of the shell and in the length of the long dorsal seta on the first exopodite segment of the fifth and sixth limbs; in the known cases this is longer in the female than in the male. The present data indicate that the males are slightly larger than the females.

Male and female specimens of the same species have been described by the same author for *B. paulula*, *B. subrufa*, *B. crosnieri* and *B. darcythompsoni*. In the latter species, according to Scott (1909), the male rostrum is bifid and the female's single, so the sexes must be separated in the key. Only mature males are known of *B. laqueata*, *B. kornickeri*, *B. foveolata*, *B. baskiae* and *B. hardingae* n. sp., one of the new species here described. In the case of *B. deeveyae* the immature female (Kornicker, 1969) and the male (George, 1971) are known. Only the females of *B. galerita* and *B. latirostris*, and the juvenile females of *B. septemspinosa*, *B. lacunosa* and *B. nodosa* have been described. The other new

species now described, *B. diacantha* n. sp., is represented by a juvenile specimen.

In the case of *B. sagittarius*, my male specimen from the intestine of *Bassozetus normalis*, an abyssal bottom fish, was crumpled into a ball and part of the posterior margin of the shell was damaged, but the posterodorsal corner of the right shell seemed to be produced in a blunt point. Both Poulsen (1972) and Angel (1973) have described the female of this species, but found no point at the posterodorsal corner. There are other discrepancies. The male was characterized by a chitinous knob on the coxa of the mandible; Angel did not mention this in his description of the female, but Poulsen noted it in his. On the first antenna Angel's females had a ventral spinose seta on the segment proximal to the one bearing the cluster of sensory filaments; such a seta has not been reported for any other *Bathyconchoecia* species, although it occurs on the two new species here described. It was not noted on the male, and unfortunately the first antennae were missing from Poulsen's specimen. Also, the male had 16 setae on the 1st segment of the endopodite of the maxilla, as apparently did Poulsen's female specimen, but Angel reported 22 setae on this segment in his females. The three descriptions agree on the sculpturing on the shell and the extraordinary number of setae on the maxillae and fifth and sixth limbs, but the possibility exists that the specimens described as *B. sagittarius* may include more than one species.

KEY TO SPECIES OF *BATHYCONCHOECIA*

1. Penultimate segment of 5th limb with 7-13 setae, of 6th limb with 8-9 setae 2
- Penultimate segment of 5th limb with 3-5 setae, of 6th limb with 2-3 setae 3
2. Shell with dense vertical striations. Mature specimens over 2.5 mm long *B. sagittarius* ♀ + ♂
- Shell with polygons or bands filled with pits; mature specimens less than 2.5 mm long *B. latirostris* ♀
3. Shell with long rostral, lateral, dorsal and posterior spines 4
- Shell without dorsal, lateral or rostral spines 5
4. Shell surface with short fringes of fine hairs *B. septemspinosa* imm. ♀
- Shell surface without fringes of fine hairs *B. deeveyae* imm. ♀ + ♂

- | | | |
|---|----------------------------------|----|
| 5. Posterodorsal corners of both shells with 2 small sharp points, larger on right shell | <i>B. diacantha</i> n. sp., juv. | 6 |
| Right posterodorsal shell corner with a point or spine | | |
| Posterodorsal shell corners without points or spines | | 10 |
| 6. Each half of rostrum bifid | <i>B. darcythompsoni</i> ♂ | |
| Each half of rostrum single | | 7 |
| 7. Posterior shell glands open level with edge of shell | | 8 |
| Shell glands open on tubercle below posterodorsal corner of both shells | | 9 |
| 8. Posterodorsal corner of right shell with a wide strong point; strong chitinized triangular process on coxa of mandible; penultimate segment of 5th limb with 4 setae | <i>B. hardingae</i> n. sp. ♂ | |
| Posterodorsal corner of right shell with a small point; no triangular process on coxa of mandible; penultimate segment of 5th limb with 3 setae | <i>B. darcythompsoni</i> ♀ | |
| 9. First segment of 1st antenna with large ventrodiscal bulge | <i>B. crosnieri</i> ♀ + ♂ | |
| First segment of 1st antenna without bulge | <i>B. subrufa</i> ♀ + ♂ | |
| 10. Length of mature individuals over 4 mm | | 11 |
| Length of mature individuals less than 4 mm | | 12 |
| 11. Posterior shell margin fairly straight with a single row of dentate structures extending anterior to the posteroventral corner | <i>B. foveolata</i> ♂ | |
| Posteroventral corner well rounded; no marginal dentate structures | <i>B. baskiae</i> ♂ | |
| 12. Length of mature individuals less than 1 mm; height 70% of length | <i>B. paulula</i> ♀ + ♂ | |
| Length of mature individuals 1.0-1.5 mm | | 13 |
| Length of mature individuals over 1.5 mm | | 14 |
| 13. Shell glands open on large rounded processes at posterodorsal corners of each shell | <i>B. nodosa</i> imm. ♀ | |
| Posterodorsal shell corners sharply right-angled | <i>B. laqueata</i> ♂ | |
| 14. Shell strikingly sculptured with reticulations forming polygonal cells filled with tiny pits | | 15 |
| Shell not strikingly sculptured though punctate pattern may be present | <i>B. galerita</i> ♀ | |
| 15. Flange of sculpturing on posterior margin beneath shell glands | <i>B. kornickeri</i> ♂ | |
| No flange of sculpturing on posterior margin | <i>B. lacunosa</i> imm. ♀ | |

***Bathyconchoecia hardingae* new species**

Figures 2-4

Holotype: Male, 4.0 mm long by 1.6 mm high. Three slides, deposited in the National Museum of Natural History, Smithsonian Institution (USNM 152437).



FIG. 1. Station locations for species of *Bathyconchoecia* described from the Caribbean Sea and Gulf of Mexico. X 1: *B. hardingae*, n. sp.; X 2: *B. foveolata*, imm. male; X 3: *B. diacantha* n. sp. juvenile; X 4: *B. sagittarius* male, *B. foveolata* male; X 5: *B. paulula* female + male; *B. laqueata* male; *B. kornickeri* male, *B. galerita* female.

Type-Locality: PILLSBURY Cruise 6911, Sta. 6: 13°30'N, 62°50'W, 1324 m depth; bottom depth 1656 m. See Fig. 1: X 1.

Etymology: This species is named for Dr. Harding B. Owre Michel.

Description of male: Shell (Fig. 2a): The height of the shell is 40% of the length, anteroventral and posteroventral corners well rounded, dorsal margin nearly straight, large point at posterodorsal corner of right shell, posterodorsal corner of left shell broken off. Rostrum pointed on both shells, and projects about 20% of the shell length beyond the anterior margin. Shell gland opens beneath point on posterodorsal corner of right shell. Posterior margin of shell with a single row of dentate structures running from the shell gland and decreasing in size to anterior of the posteroventral corner. Faint scalelike sculpturing on the rostrum and anterior dorsal region, with vertical and oblique lines more visible ventrally, as shown in Fig. 2a.

First antenna (Fig. 3a): This consists of 5–6 visible segments, although Poulsen (1969a) suggested that 7 joints are represented but not clearly defined. The most distal joint bears 4 setae, the principal seta exceptionally long with fine spinules dorsally and distally, broken off as figured. The 6th segment bears a stout plumose seta. Accord-

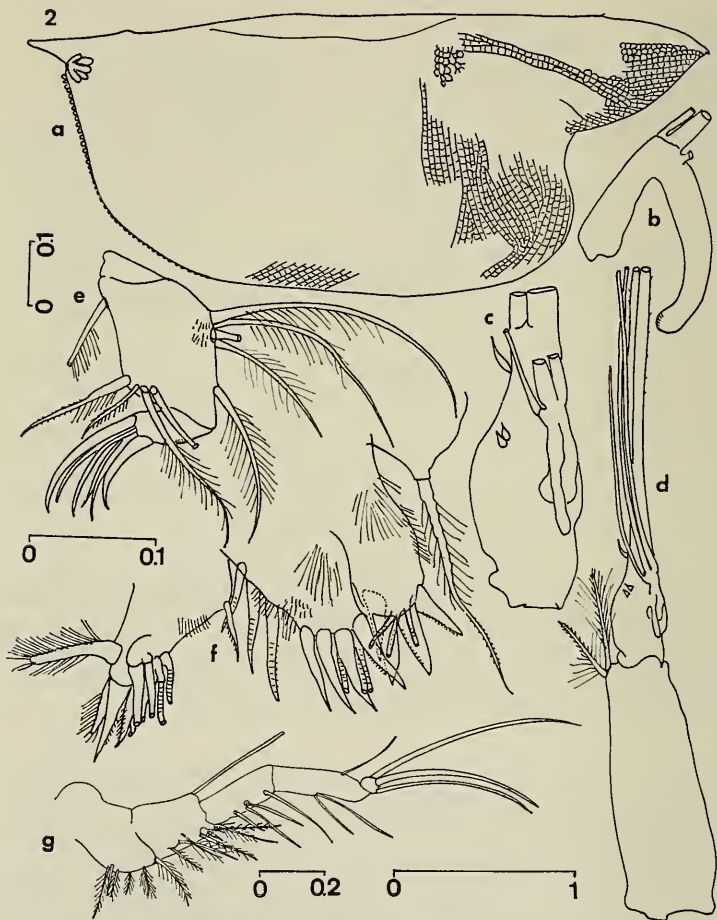


FIG. 2. Male *Bathyconchoecia hardingae*, n. sp. a, Lateral view of right shell; b, Right clasp organ; c, Distal segment of endopodite of left second antenna, setae cut off; d, Endopodite of left second antenna, longer setae cut off; e, Endopodite of maxilla; f, Coxal and precoxal endites of maxilla; g, Sixth limb. Scale for a at bottom right, for e at bottom left, for d and e on upper left margin, for c and f at left center. Scales in mm.

ing to Poulsen, the 5th segment bears the cluster of sensory filaments, which contains perhaps 15 rows of around 25 filaments per row, and there are therefore probably 300-400 filaments in the cluster. On the joint above the cluster there is a group of long hairs and a line of

shorter ones. Each first antenna has a strong seta on the ventral surface of the segment proximal to the sensory cluster, with a group of long hairs distal to it. Angel (1973) described a similar ventral seta and cluster of hairs for his female *B. sagittarius*, but such a seta has not been noted in any other species. The first 2 segments have no hairs or setae, but the 1st segment has a disto-ventral bulge. No remnant of a frontal organ was observed.

Second antenna (Fig. 2b-d): The length of the basal segment of the exopodite is around 63% of that of the shaft, the 1st segment of the endopodite around 43% of shaft length. The basal segment of the endopodite bears 2 plumose bristles distally, with long hairs proximally; the longer bristle was broken on both endopodites. The 2nd segment has distally 2 long setae with spinules at regular intervals, the longest broken at 3 mm length, the shorter 2 mm long, with a single spine proximally to their base. The right clasping organ (Fig. 2b) is large and sharply curved with 3 non-plumose setae of varying length, the longest broken at 0.8 mm, the 2nd 0.45 mm long, and the shortest only 0.25 mm long. The left clasping organ is much smaller (Fig. 2c, d) and bent back over its base, also with 3 setae of similarly varying lengths. The 2nd segment also has 2 short fat spinules near the base of the claspers.

Mandible (Fig. 3b, c; Fig. 4b): There is a strongly chitinized knob-like articular process on the coxa (Fig. 3b, c), as in *B. sagittarius* and *B. latirostris*, which has not been reported for other *Bathyconchoecia* but is common in *Conchoecia* and *Euconchoecia* species. The coxal endite has several tooth rows, with serrations of varying size; the masticatory pad consists of rows of denticles and bristling spines. The basale has 6 teeth and 2 spine-teeth. As in most other species there are 3 plumose setae on the basale near the articulation of the endopodite. The 1st segment of the endopodite has 5 setae, 1 plumose, and many fine long hairs; the 2nd segment 4 setae, and the last 6 setae and a group of long hairs near the articulation with the 2nd segment.

Maxilla (Fig. 2e, f): The endopodite (Fig. 2e) is similar to that of other species, except *B. sagittarius* and *B. latirostris*; the 1st segment has 10 plumose setae and the distal segment 2 claws and 4 setae. The precoxal endite (Fig. 2f) has 4 stout rather long bristles and 6 tubelike bristles; the coxal endite has some 14-17 bristles, including several tubelike ones.

Fifth limb (Fig. 4a): The protopodite has 3 plumose and 3 bare setae, the endopodite 3 plumose and 5 bare setae and 2 claws. The 1st segment of the exopodite has 5 plumose and 4 bare setae, as well as the long dorsal seta characteristic of this genus; it appears partially segmented at the point where the long dorsal seta arises. The 2nd segment has 4 bare setae, and the last segment 2 clawlike setae and a bare seta.

Sixth limb (Fig. 2g): The protopodite has 6 plumose setae, the 1st segment of the exopodite 6 plumose setae, 1 small bare seta, and the

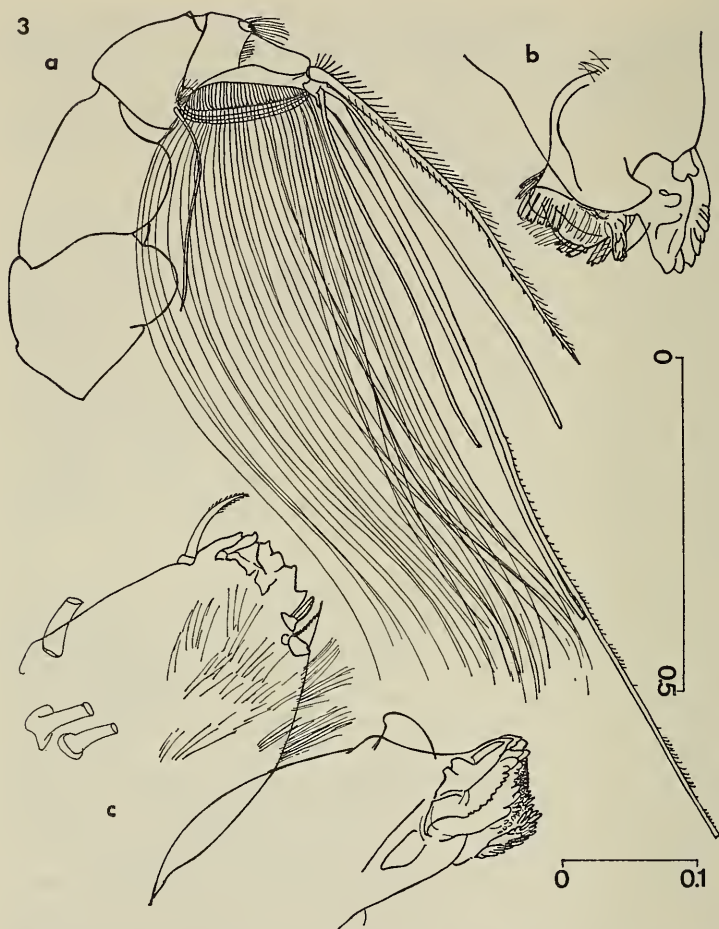


FIG. 3. *Bathyconchoecia hardingae* n. sp., male. a, First antenna; b, Incisor and molar surfaces of coxa of mandible; c, Incisor surface of basale and another view of incisor and molar surfaces of coxa of mandible. Scale on center right margin for a, at bottom right for b and c. Scales in mm.

long dorsal seta, broken on this specimen. The 2nd segment has 4 bare setae, the 3rd segment 3 bare setae, and the 4th 2 long slim clawlike setae and a bare seta.

Seventh limb (Fig. 4e): This bears distally 2 bristles, 1 at least twice as long as the other. At least near the proximal end of the larger bristle there is a very fine double comb of tiny spinules.

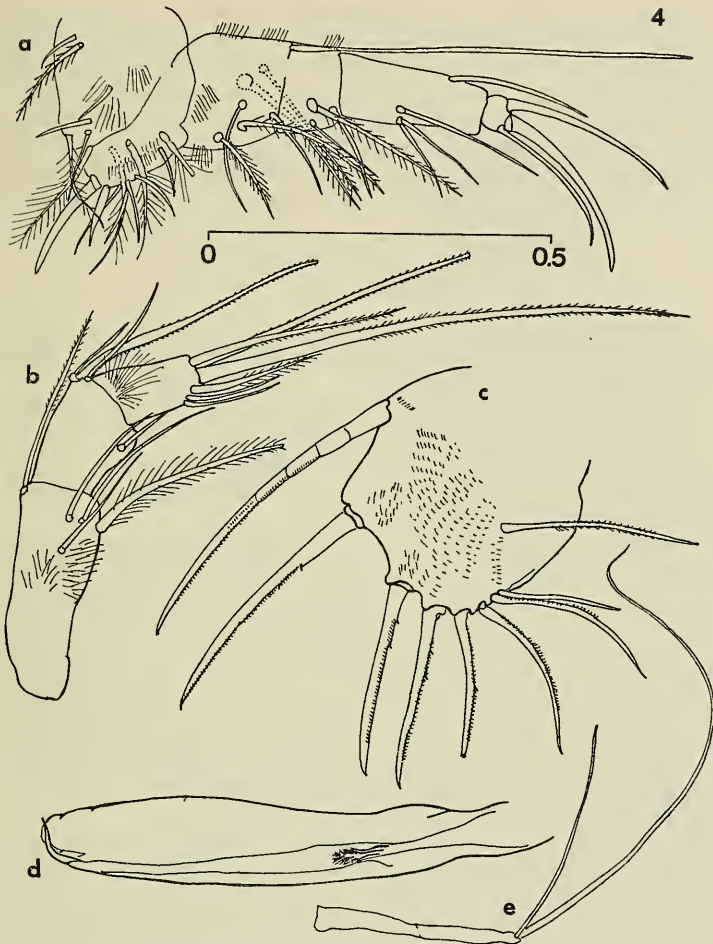


FIG. 4. *Bathyconchoecia hardingae*, n. sp., male. a, Fifth limb; b, Endopodite of mandible; c, Furca; d, Penis; e, Seventh limb. Scale in mm.

Penis (Fig. 4d): This is long, straight and slim, bluntly rounded at the tip.

Furca (Fig. 4c): As in all other described species except *B. deeveyae* there are 8 pairs of claws on this mature male. The 1st is 5-jointed, and all are very long, slim and weak. There is also a long slim unpaired bristle. The furcal lamella is partially covered with fine hairs.

Remarks: *B. hardingae* n. sp. differs from all other species except *B. sagittarius* and *B. latirostris* in having a highly chitinized knoblike articulation on the coxa of the mandible, but it is easily differentiated from these species by the size and shape of the shell, and by having only 3 or 4 setae on the penultimate segment of the 5th and 6th limbs. It is also distinguished from all species except Angel's (1973) female *B. sagittarius* by the long ventral seta on the segment proximal to the one bearing the large cluster of sensory filaments on the 1st antenna.

***Bathyconchoecia diacantha* new species**

Figures 5-6

Holotype: juvenile specimen 1.25 mm long by 0.5 mm high. Two slides, deposited in the National Museum of Natural History, Smithsonian Institution (USNM 152438).

Type locality: PILLSBURY Cruise 6811, Sta. 12: 14°50'N, 80°45'W, 1100 m depth; bottom depth 1189 m. Figure 1: × 3.

Etymology: The specific name is derived from the Greek "acantha," meaning spine or thorn, and refers to the 2 small points at the posterodorsal corner of both shells.

Description: Shell (Fig. 5a-c): The height of the shell is about 40% of the length, the anteroventral and posteroventral corners well rounded, anterior and posterior margins rounded, dorsal margin fairly straight. The rostrum is slim and pointed in lateral view, and projects 20% of the shell length beyond the anterior margin. There are 2 small sharp points at the posterodorsal corner of each shell, larger on the right shell (Fig. 5c). The shell glands are located beneath the posterodorsal points, and beneath these there is a single row of serrations or dentate structures extending to just anterior to the posteroventral corner. The sculpturing on the shell consists of faint vertical lines, as indicated in Figure 5b.

First antenna (Fig. 5d): In this juvenile specimen the penultimate segment bears the stout plumose seta and the last segment 4 setae, the principal seta the longest with a few spinules on both sides near the distal end, the total number of setae therefore being the same as in mature individuals. The cluster of sensory filaments is not as large as in the described mature specimens, possibly no more than 100 filaments being present. Only 1 of the 2 1st antennae bear ventrally on what may become the segment proximal to the sensory cluster a short seta, and distal to this a bunch of long hairs. No trace of this seta was found on the other 1st antenna. Presumably this seta is comparable to the ventral seta just described for *B. hardingae* n. sp. and Angel's female *B. sagittarius*, and it is probable that the mature individual will have a long ventral seta on each 1st antenna. No remnant of a frontal organ was noted.

Second antenna (Fig. 6e): The 1st segment of the exopodite is around 55% of shaft length, the basal segment of the endopodite about

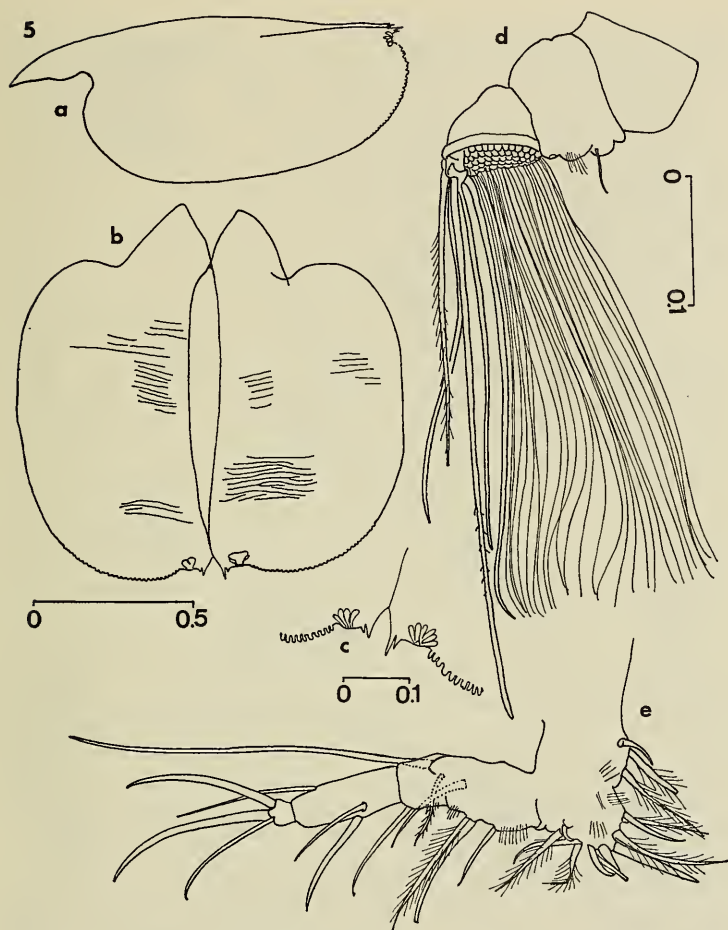


FIG. 5. *Bathyconchoecia diacantha*, n. sp., juvenile. a and b, Lateral and dorsal view of shell; c, Dorsal view of posterodorsal corner of both shells opened out; d, First antenna; e, Fifth limb. Scale below b for a and b, below c for c, at upper right for d and e. Scales in mm.

35% of shaft length. The 1st segment of the endopodite has only 1 long spinose bristle, and the 2nd segment appeared to bear only 3 setae, the longest broken, with some spinules distally.

Mandible (Fig. 6a, b): The basale has 6 teeth and 2 spine-teeth, the surface is covered with long hairs, and there are 4 long and 1 short setae, aside from 2 setae near the base of the endopodite, 1 of which is



FIG. 6. *Bathyconchoecia diacantha*, n. sp., juvenile. a, Basale with endopodite and molar and incisor surface of coxa of mandible; b, Another view of incisor surface of basale; c, Sixth limb; d, Coxal and precoxal endites of maxilla; e, Endopodite of second antenna; f, Seventh limb; g, Endopodite of maxilla; h, Furca. Scale in mm.

plumose. The endopodite has 1 seta on the 1st segment, 2 on the 2nd, and 6 spinous setae on the last segment. There is a small, strongly chitinized knoblike process on the coxa, 2 strong teeth rows, and the masticatory pad consists of rows of denticles and spinules.

Maxilla (Fig. 6d, g): The 1st segment of the endopodite has 7 plumose setae, the distal segment 2 claws and only 3 bare setae. The precoxal endite has 7 bristles, of which one has long spines and 3 are tubelike; the coxal endites have a total of 14 bristles. These are relatively long and slim in shape, as in the group of larger species.

Fifth limb (Fig. 5e): The protopodite has 2 plumose and 1 short bare seta, and is not clearly separated from the endopodite, which has 2 claws, 5 plumose and 4 bare setae. The exopodite has 2 slim claw setae on the distal segment, 3 bare setae on the 2nd segment, and 2 plumose, 4 bare setae, and the very long dorsal seta on the 1st segment. There are tufts of hairs on the protopodite, endopodite and the proximal ventral surface of the exopodite.

Sixth limb (Fig. 6c): This was segmented into only 3 distinct joints, the most distal with 2 very long slim claw-setae, the 2nd exopodite segment with 2 bare setae; the basal segment of the exopodite, not clearly separated from the protopodite, has only the long dorsal seta, broken on this specimen, and 2 setae, at least 1 plumose. The protopodite bears only 2 plumose setae and a spine. The epipodial appendage has 3 groups of 6, 5, 5 setae each.

Seventh limb (Fig. 6f): This has 2 relatively short setae, 1 much larger than the other, both bearing a row of hairs.

Furca (Fig. 6h): This has 5 claws on each lamella and a single long unpaired bristle. The 1st claw is at least 3-jointed, and there are long hairs on the lamellae.

Remarks: With 5 pairs of claws on the furca this specimen is 3 moults from maturity. Angel (1970) has described the juvenile development of *B. subrufa* on the basis of 11 females, 3 males and 87 juveniles at 4 different stages of development. The males were 3.48–3.515 mm and the females 3.16–3.35 mm long. This 1.25-mm juvenile is at the same stage of development as the 1.0-mm *B. subrufa* juveniles, and should therefore be around 4 mm long when mature. Angel found that the adult setation of the 1st antenna was present at this stage, but did not note whether the number of sensory filaments in the cluster changed during development. He also noted that the 1st segment of the endopodite of the 2nd antenna had 1 distal bristle at this stage, and 2 bristles were present in the last 2 juvenile stages. In *B. subrufa* the tooth lists of the mandible were similar at all stages, but the number of setae on the basale and 1st 2 endopodite segments increased with growth; his 1.0-mm juveniles had the adult setation on the 3rd segment, as does this 1.25-mm juvenile. The number of setae on the 1st endopodite segment of the maxilla increased during development, but the distal segment had the adult setation in Angel's earliest stage; the present specimen either lacks or has lost 1 seta of the adult number on the distal segment, although it has more setae on the 1st segment than the *B. subrufa* juvenile at the same stage. The setation of the 5th and 6th limbs increases during development, but Angel found that the long

dorsal setae were present on the earliest stage examined. With the exception of *B. deeveyae* which is reported (George, 1971) to have 7, all mature *Bathychonchoecia* have 8 pairs of claws on the furca. The last 4 juvenile stages of *B. subrufa* gained 1 pair/moult. Since in *B. subrufa* the 1st claw is apparently not jointed, there are no data to indicate whether the mature *B. diacantha* n. sp. would have a 1st claw with more than 3 joints, but it is probable that it would.

This species is distinguished from all others by the 2 sharp points at the posterodorsal corners of both shells, and belongs in the group of large species. *B. diacantha* n. sp. differs from all species except *B. sagittarius*, *B. latirostris*, and *B. hardingae* n. sp. in having a knoblike articular process on the coxa of the mandible. It is also distinguished from the other species, except *B. hardingae* n. sp. and Angel's female *B. sagittarius*, by having a short (at least at this juvenile stage) seta on the ventral surface of the segment proximal to the sensory cluster on the 1st antenna.

Bathychonchoecia foveolata Deevey

Figures 7-8

Bathychonchoecia foveolata Deevey, 1968, p. 565, Figs. 12-13.

Material: 1 immature male, 2.4 mm long. 3 slides.

Locality: PILLSBURY Cruise 6911, Sta. 1: 18°00'N, 64°44'W, 1371 m depth; bottom depth 3008 m. Figure 1: $\times 2$.

Description of immature male: Shell (Fig. 7a, b): The height of the shell is around 45% of the length, anteroventral and posteroventral corners rounded, dorsal and ventral margins fairly straight, posterodorsal corner bluntly rounded with shell glands opening in depression below posterodorsal corners. Rostrum rounded, projecting around 21% of the total length beyond the anterior margin. A faint pattern of reticulations was visible on the shell, and the posterior margin and at least half of the ventral margin are fringed with a single row of serrations or dentate structures, decreasing in size anteriorly (Fig. 7b).

First antenna: This was missing.

Second antenna (Fig. 7c, d): The 1st segment of the exopodite is 51% of shaft length, the 1st endopodite segment 30% of shaft length. On the distal endopodite segment the incipient clasping organs are represented by similar small knobs, each bearing 3 setae of varying lengths, all shorter than the 2 longer setae borne at the distal end, which were broken on both endopodites. At the distal end of the 1st endopodite segment there are 2 bristles, one more than twice as long as the other with long hairs proximally and spinules more distally. There are 2 small fat spinules on the distal endopodite segment beside the knoblike precursors of the claspers.

Mandible (Fig. 7e, f): The basale has a tooth row of 6 teeth and 2 spine-teeth somewhat removed from the tooth row; it has a total of 9 setae, 4 plumose, including 3 near the base of the endopodite, which

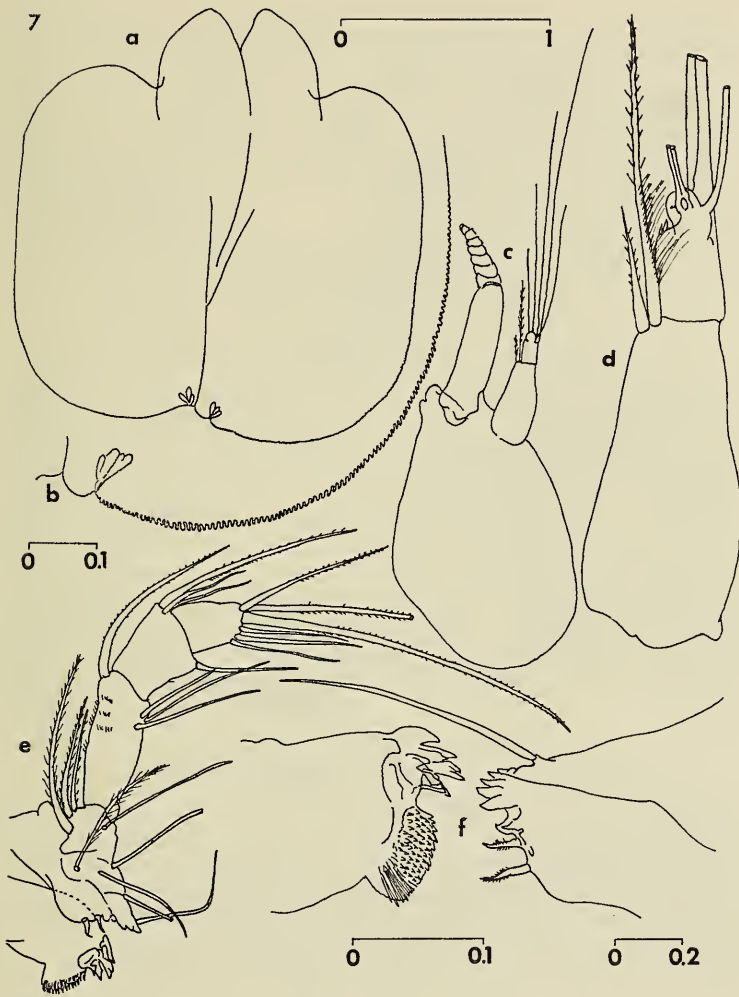


FIG. 7. *Bathyconchoecia foveolata*, immature male. a, Dorsal view of shell opened; b, Posterior and ventral margins of shell, showing fringe of serrations; c, Right second antenna, exopodite setae not shown; d, Endopodite of left second antenna, setae cut off; e, Basale and endopodite and part of coxa of mandible; f, Incisor surface of basale and incisor and molar surfaces of coxa of mandible. Scale for a at top center, for b and c at bottom right, at left center margin for e, at bottom center for d and f. Scales in mm.

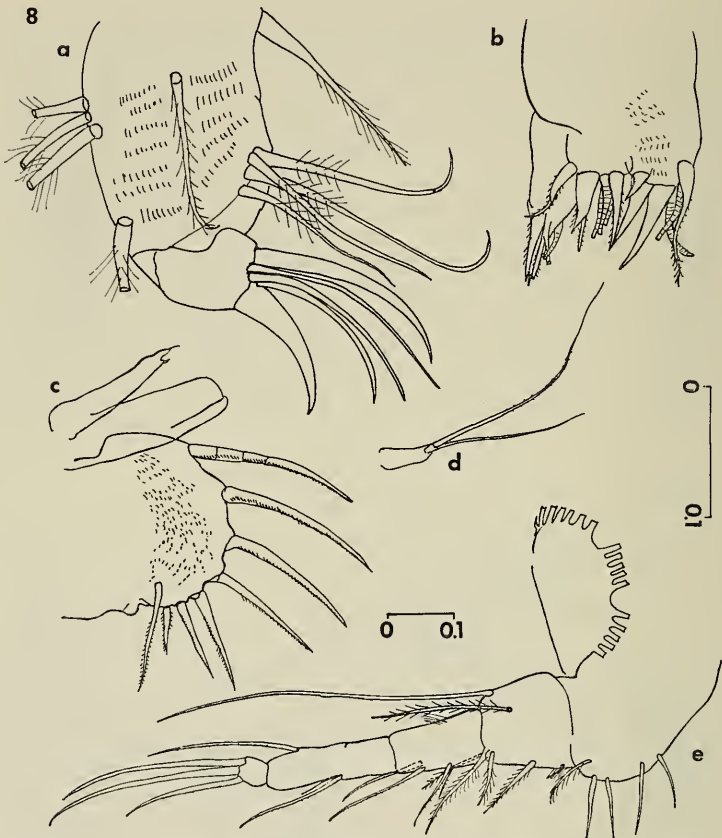


FIG. 8. *Bathyonchoecia foveolata*, immature male. a. Endopodite of maxilla; b, Coxal and precoxal endites of maxilla; c, Furca and immature penis; d, Seventh limb; e, Sixth limb. Scale for a and b at center right margin, for c, d, e at lower center. Scales in mm.

is similar to that of the *B. foveolata* male except that the 1st segment has 4 instead of 5 setae. The incisor surface of the coxa has 2 strong tooth rows with 8-9 teeth each of varying size; the molar surface is strongly rounded and covered with denticles and spines.

Maxilla (Fig. 8a, b): The precoxal and coxal endites have some 6, 7, and 6 long pointed bristles of which at least 9 are tubelike, the others spiny. The endopodite has 10 plumose setae on the basal segment; this specimen had 2 claws and only 3 bare setae on the distal segment, 1 seta longer than the other 2.

Fifth limb: This was missing.

Sixth limb (Fig. 8e): The protopodite has 5 setae; the 1st segment of the exopodite has 5 plumose setae, the long dorsal seta, and 1 small spine, the 2nd segment has 4 setae with tiny spinules, the 3rd 3 setae, and the 4th the 2 long slim claw-setae and a shorter seta with tiny spinules. The epipodial appendage has groups of 7 (1 tiny), 5, 5 setae.

Seventh limb (Fig. 8d): This has 2 setae, 1 longer with tiny spinules.

Penis and furca (Fig. 8e): The shape of the immature penis is shown in Figure 8e. The furca has 7 pairs of claws, the 1st 4-jointed, and a long unpaired bristle. The lamella is covered with fine hairs. The 1st claw of the male *B. foveolata* furca is 5-jointed.

Remarks: This specimen is identified as *B. foveolata* because the shape of the shell, its sculpturing and the fringe of serrations on the posterior and ventral margin agree with that of this species. Judging from the growth data obtained by Angel (1970) for *B. subrufa* a 2.4-mm immature male should be 3.5–4 mm long when mature. The described *B. foveolata* male was 5.2 mm long. The structure of the mandible appears similar to that of *B. foveolata*; the coxa also lacks the strongly chitinized process. The setation of the maxilla could be that of the immature male. The setation of the 6th limb is similar, as are the relative lengths of the claws on the furca. This specimen has the characteristics of the group of large species: long hairs proximally on the larger bristle of the 1st segment of the endopodite of the 2nd antenna, a shell height of around 45% of its length, and coxal and pre-coxal endites with long slim bristles.

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